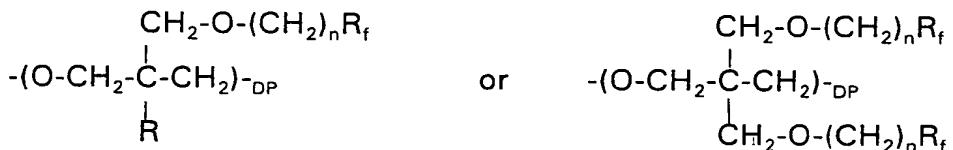


WHAT IS CLAIMED IS:

1. A block copolymer composition, comprising:

at least one polyfluorooxetane block bonded to a polyether block,

5 said polyfluorooxetane block having a repeat unit of the formula



wherein each n is, independently, 1 to about 6, wherein R is hydrogen or

10 an alkyl group having from 1 to 6 carbon atoms, and wherein each R_f is, independently, a linear or branched alkyl group of from 1 to about 20 carbon atoms with a minimum of 50% of the hydrogen atoms of said R_f alkyl group being replaced by F, and optionally up to all of the remaining H atoms being replaced by I, Cl, or Br, or each said R_f group, where DP is from 2 to about 100;

15 and

wherein said polyether block has ether repeat units of from 2 to about 6 carbon atoms, and wherein the number average molecular weight of said polyether block is from about 250 to about 10,000.

20 2. A block copolymer composition according to claim 1, wherein said DP is from 2 to about 30, and wherein said polyfluorooxetane block is an oligomer, a polymer, or a copolymer.

25 3. A block copolymer composition according to claim 2, wherein said R_f contains a minimum of 75 percent of said hydrogen atoms being replaced by F.

4. A block copolymer composition according to claim 3, wherein the number average molecular weight of said polyether block is from about 300 to about 5,000, and wherein said polyfluorooxetane block is also derived from tetrahydrofuran.

5

5. A block copolymer composition according to claim 4, wherein said DP is from about 4 to about 20, and wherein said polyether is polyethylene, polypropylene, or a copolymer of ethylene and propylene.

10 6. A block copolymer composition according to claim 5, wherein n is from 1 to about 3, R is methyl or ethyl, wherein said R_f is from 1 to about 7 carbon atoms and contains a minimum of 95% of said hydrogen atoms being replaced by F.

15 7. A block copolymer composition according to claim 6, wherein said block copolymer is an AB, or a BAB, or a BA, or an ABA block copolymer, wherein said A block is said polyether block and said B block is said polyfluorooxetane block.

20 8. A flow, or wetting, or leveling agent, comprising the composition of claim 1.

9. A flow, or wetting, or leveling agent, comprising the composition of claim 3.

25

10. A flow, or wetting, or leveling agent, comprising the composition of claim 5.

11. A flow, or wetting, or leveling agent, comprising the composition of
claim 7.

12. A solution comprising a flow, or leveling, or wetting agent
5 comprising the composition of claim 1.

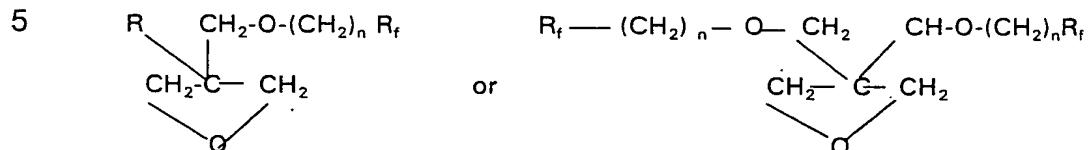
13. A polymer solution containing a flow, or leveling, or wetting agent
comprising the composition of claim 1, wherein said polymer is an aqueous
soluble, dispersible, or an emulsifiable polymer.

10 14. A polymeric solution containing a flow, or leveling, or wetting agent
comprising the composition of claim 6, wherein said polymer is an aqueous
soluble, dispersible, or emulsifiable, polymer, and wherein said aqueous soluble
polymer is a polyacetate, a polyacrylate, a polyacrylic acid, a polyester, a
15 polyether, a polyurethane, or a fluorine containing polymer, or combinations
thereof.

20 15. A polymeric solution containing a flow, or leveling, or wetting agent
comprising the composition of claim 1, wherein said polymer is a solvent soluble
polymer.

25 16. A polymeric solution containing a flow, or leveling, or wetting agent
comprising the composition of claim 6, wherein said polymer is a solvent soluble,
polymer, and wherein said solvent soluble polymer is a polyacrylate, a polyester,
a polyurethane, an alkyd, an epoxy, or a fluorine containing polymer, or
combinations thereof.

17. A composition comprising:
the reaction product of a polyether initiator and a fluorooxetane monomer
having the formula



10 wherein each n is, independently, 1 to about 6, wherein R is hydrogen or an alkyl group having from 1 to 6 carbon atoms, and wherein each Rf is, independently, a linear or branched alkyl group of from 1 to about 20 carbon atoms with a minimum of 50% of the hydrogen atoms of said Rf alkyl group being replaced by F, and optionally up to all of the remaining H atoms being replaced by I, Cl, or Br, and wherein said polyether initiator has at least one reactive hydroxyl end group, and has repeat groups containing from 2 to about 6 carbon atoms.

20 18. A composition according to claim 17, wherein Rf has from 1 to 7 carbon atoms and a minimum of 90 percent of said hydrogen atoms being replaced by F, and wherein said polyether has a molecular weight of from about 300 to about 5,000.

25 19. A composition according to claim 18, including tetrahydrofuran monomers, and wherein said polyethylene block has 2 reactive hydroxyl end groups.

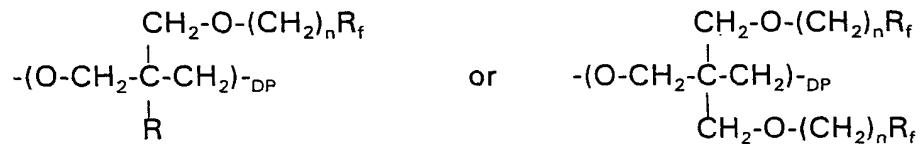
30 20. A composition according to claim 19, wherein n is 1 to 3, wherein R is methyl or ethyl, wherein said polyether initiator has repeat groups of 2 or 3 carbon atoms, or combinations thereof, and wherein the number average molecular weight of said polyether block is from about 350 to about 2,500.

21. A composition according to claim 20, wherein said reaction product is an AB or a BAB block copolymer wherein said A block is said polyether block and said B block is derived from said fluorooxetane monomers.

5

22. A composition comprising:

the reaction product of a polyfluorooxetane initiator and an alkyl oxide monomer having from 2 to about 6 carbon atoms, wherein said polyfluorooxetane initiator is an oligomer, a polymer, or a copolymer having 1 or 10 2 hydroxyl end groups, and having a repeat unit of the formula



15 wherein each n is, independently, 1 to about 6, wherein R is hydrogen or an alkyl group having from 1 to 6 carbon atoms, and wherein each R_f is, independently, a linear or branched alkyl group of from 1 to about 20 carbon atoms with a minimum of 50% of the hydrogen atoms of said R_f alkyl group being replaced by F, and optionally up to all of the remaining H atoms being 20 replaced by I, Cl, or Br and DP is from about 2 to about 100.

23. A composition according to claim 22, wherein R_f has from 1 to 7 carbon atoms and a minimum of 90 percent of said hydrogen atoms being replaced by F.

25

24. A composition according to claim 23, wherein said polyfluorooxetane copolymer contains repeat groups derived from tetrahydrofuran, and wherein said polyfluorooxetane initiator has two hydroxyl end groups.

25. A composition according to claim 24, wherein n is 1 to about 3, wherein R is methyl or ethyl, wherein DP is from about 4 to about 20, wherein said alkylene oxide monomers are ethylene oxide, or propylene oxide, or combinations thereof.

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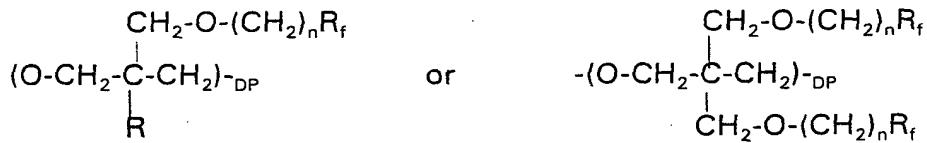
26. A composition according to claim 25, wherein said reaction product is a BA or an ABA block copolymer wherein said A block is a polyether block and said B block is a polyfluorooxetane oligomer, polymer, or copolymer.

10

27. A block copolymer, comprising:

a polyfluorooxetane block connected to at least one polyether block by reaction with a polyisocyanate, said polyfluorooxetane block comprising an oligomer, polymer, or copolymer, having repeat units of the formula

15



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wherein each n is an integer of from 1 to about 6, wherein each R_f independently, is linear or branched, unsaturated or saturated alkyl group of from 1 to about 20 carbon atoms with a minimum of 50% of the hydrogen atoms of said alkyl group being replaced by F, wherein R is hydrogen or an alkyl having from 1 to about 6 carbon atoms, and wherein DP is from about 2 to about 100, and

25

wherein said polyether block has ether repeat units containing from 2 to about 6 carbon atoms.

28. A block copolymer according to claim 27, wherein said polyether block has a number average molecular weight of from about 200 to about 5,000, and wherein said polyisocyanate has the formula $R(NCO)_n$, where n is from 2 to 4 and R is an aliphatic, an aromatic, or combinations thereof having 5 from 4 to about 30 carbon atoms.

29. A block copolymer according to claim 28, wherein R_f has a minimum of 75 percent of said hydrogen atoms replaced with F, and wherein said polyfluorooxetane block is also derived from tetrahydrofuran.

10

30. A block copolymer according to claim 29, wherein said polyether block has a number average molecular weight of from about 350 to about 2,000, and wherein said polyisocyanate is a diisocyanate, and wherein said polyether has a repeat unit containing 2 carbon atoms, or 3 carbon atoms, or 15 combinations thereof, and wherein said DP is from 5 to about 30.

31. A block copolymer according to claim 30, wherein said block copolymer is an ABA block copolymer or an BAB block copolymer wherein said A block is said polyether block and said B block is said polyfluorooxetane block, 20 wherein R_f has a minimum of 95 percent of said hydrogen atoms replaced with F, wherein the number of carbon atoms in said R_f is from 1 to about 7, wherein n of said repeat unit is from 1 to about 3, and wherein said diisocyanate is isophorone diisocyanate.

25 32. A flow, or leveling, or wetting agent, comprising the composition of claim 27.

33. A flow, or leveling, or wetting agent, comprising the composition of claim 29.

34. A flow, or leveling, or wetting agent, comprising the composition of claim 31.

5 35. A solution containing a flow, or leveling, or wetting agent comprising the composition of claim 27.

10 36. A polymeric solution containing a flow, or leveling, or wetting agent comprising the composition of claim 27, and wherein said polymer is an aqueous soluble, dispersible, or emulsifiable, polymer.

15 37. A polymeric solution containing a flow, or leveling, or wetting agent comprising the composition of claim 30, wherein said polymer is an aqueous soluble, dispersible, or emulsifiable, polymer, and wherein said aqueous soluble polymer is a polyacetate, a polyacrylate, a polyacrylic acid, a polyester, a polyether, or a polyurethane, or a fluorine containing polymer, or combinations thereof.

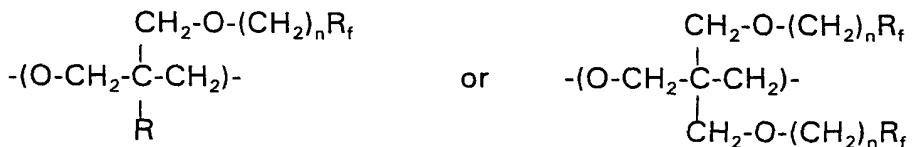
20 38. A polymeric solution containing a flow, or leveling, or wetting agent comprising the composition of claim 27, wherein said polymer is a solvent soluble polymer.

25 39. A polymeric solution containing a flow, or leveling, or wetting agent comprising the composition of claim 30, wherein said polymer is a solvent soluble polymer, and wherein said solvent soluble polymer is a polyacrylate, a polyester, a polyurethane, an alkyl, an epoxy, or a fluorine containing polymer, or combinations thereof.

40. A composition, comprising:

the reaction product of a hydroxyl terminated fluorooxetane oligomer, polymer, or copolymer having 1 or 2 hydroxyl end groups and, having a repeat unit of the formula

5



10 wherein each n is, independently, 1 to about 6, wherein R is hydrogen or an alkyl having from 1 to 6 carbon atoms, and wherein each R_f is, independently, a linear or branched alkyl group of from 1 to about 20 carbon atoms with a minimum of 50% of the hydrogen atoms of said R_f alkyl group being replaced by F, and optionally up to all of the remaining H atoms being replaced by I, Cl, or Br, where said oligomer, 15 polymer, or copolymer, is terminated by at least one hydroxyl group,

with a carboxylic acid having from about 1 to about 20 carbon atoms, or a lactone having a total of from 4 to about 10 carbon atoms.

41. A composition according to claim 40, wherein each R_f, independently, has 20 a minimum of 75% of the hydrogen atoms of said alkyl group being replaced by F, and

wherein said acid is a saturated monocarboxylic acid having from 1 to about 20 carbon atoms, or an unsaturated monocarboxylic acid having from 2 to about 24 carbon atoms, or a lactone having from 4 to about 10 carbon atoms, or combinations 25 thereof.

42. A composition according to claim 41, wherein each said R_f, independently, has a minimum of 90% of the hydrogen atoms of said alkyl group being replaced by F, wherein when said fluorooxetane oligomer, polymer, or 30 copolymer has one hydroxyl end group the degree of polymerization thereof is from

about 2 to about 20, and wherein said fluorooxetane oligomer, polymer, or copolymer has two hydroxyl end groups, and wherein the degree of polymerization thereof is from about 4 to about 30.

5 43. A composition according to claim 42, wherein n is from 1 to about 3, wherein said R_f group is perfluorinated, wherein said R_f has a total of from 1 to about 7 carbon atoms, wherein said fluorooxetane oligomer, polymer, or copolymer has two hydroxyl end groups and wherein the degree of polymerization thereof is from about 4 to about 20, and wherein said acid is said unsaturated acid having from about 16 to
10 about 20 carbon atoms.

44. A composition according to claim 43, wherein R is methyl or ethyl and wherein R_f contains from 1 to about 4 carbon atoms.

15 45. A flow agent, or a wetting agent, or a leveling agent, comprising the composition of claim 40.

46. A flow agent, or a wetting agent, or a leveling agent, comprising the composition of claim 42.

20 47. A flow agent, or a wetting agent, or a leveling agent, comprising the composition of claim 43.

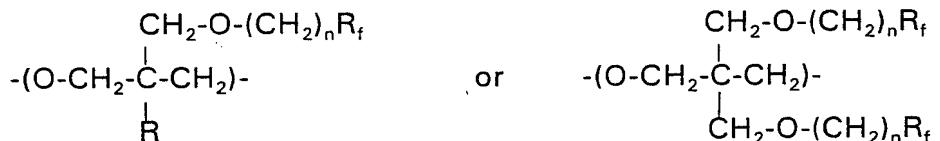
25 48. A solution comprising a flow, or leveling, or wetting agent comprising the composition of claim 40.

49. An polymeric solution comprising a flow, or leveling, or wetting agent comprising the composition of claim 42, wherein said polymer is a solvent soluble polymer and wherein said solvent soluble polymer is a polyacrylate, a polyester, a
30 polyurethane, an epoxy, a fluorine containing polymer, or an alkyd.

50. An alkyd paint, comprising a flow agent, or a wetting agent, or a leveling agent, comprising the composition of claim 43.

5 51. A composition, comprising:

a terminal cation covalently bonded to a fluorooxetane oligomer, polymer, or copolymer, or a polyether block copolymer, having at least one hydroxyl end group and having a fluorooxetane repeat unit of the formula



15 wherein each n is, independently, 1 to about 6, wherein R is hydrogen or an alkyl having from 1 to 6 carbon atoms, and each R_f being, independently, a linear or branched alkyl group of from 1 to about 20 carbon atoms with a minimum of 50% of the hydrogen atoms of said R_f alkyl group being replaced by F, and optionally up to all of the remaining H atoms being replaced by I, Cl, or Br.

20 52. A composition according to claim 51, wherein R_f contains a minimum of 75% of the hydrogen atoms of said alkyl group being replaced by F, and wherein said cation is inorganic.

25 53. A composition according to claim 52, wherein the number of said repeat units is from 2 to about 50, wherein R_f contains a minimum of 90% of the hydrogen atoms of said alkyl group being replaced by F, wherein R_f contains from 1 to about 7 carbon atoms, and wherein said cation is ammonium, or a quarternary ammonium, or phosphonium.

54. A composition according to claim 53, wherein R_f is perfluorinated and contains from 1 to 4 carbon atoms, wherein said fluorooxetane oligomer, polymer or copolymer is said copolymer, wherein said copolymer is also derived from tetrahydrofuran, and wherein said block copolymer is a fluorooxetane oligomer, 5 polymer, or copolymer block bonded to at least one polyether block.

55. A composition according to claim 54, wherein n is from 1 to about 3, wherein R is methyl or ethyl, and wherein the number of said repeat units is from about 4 to about 15.

10

56. A composition according to claim 55, wherein said polyether block has ether repeat units of from 2 to about 6 carbon atoms, and wherein the number average molecular weight of said polyether block is from about 250 to about 10,000.

15 57. A flow, or wetting, or leveling agent, comprising the composition of claim 51.

58. A flow, or wetting, or leveling agent, comprising the composition of claim 53.

20

59. A flow, or wetting, or leveling agent, comprising the composition of claim 55.

25 60. A solution containing a flow, or leveling, or wetting agent, comprising the composition of claim 51.

61. A polymeric solution containing a flow, or a leveling, or a wetting agent comprising the composition of claim 51, and wherein said polymer is an aqueous soluble, or dispersible, or emulsifiable, polymer.

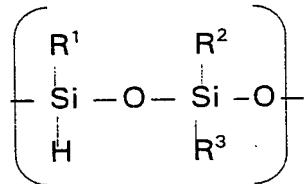
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62. A polymeric solution containing a flow, or a leveling, or a wetting agent comprising the composition of claim 52, wherein said polymer is an aqueous soluble, dispersible, or emulsifiable polymer, and wherein said polymer is a polyacetate, a polyacrylate, a polyacrylic acid, a polyester, a polyether, or a polyurethane, or 5 combinations thereof.

63. A polymeric solution containing a flow, or a leveling, or a wetting agent comprising the composition of claim 54, wherein said polymer is an aqueous soluble, dispersible, or emulsifiable polymer, and wherein said polymer is a polyacetate, a 10 polyacrylate, a polyacrylic acid, a polyester, a polyether, or a polyurethane, or a fluorine containing polymer, or combinations thereof.

64. A polymeric solution containing a flow, or a leveling, or a wetting agent comprising the composition of claim 56, wherein said polymer is an aqueous soluble, 15 dispersible, or emulsifiable, polymer and wherein said polymer is a polyacetate, a polyacrylate, a polyacrylic acid, a polyester, a polyether, or a polyurethane, or a fluorine containing polymer, or combinations thereof.

65. A grafted polysiloxane composition, comprising:
20 a polysiloxane having a repeat unit of the formula



25 wherein R¹, R², and R³, independently, is a hydrogen or an alkyl having from 1 to about 20 carbon atoms with the proviso that at least one of said R¹, R², and R³ groups is an alkyl,

30 said polysiloxane repeat unit having a pendant fluorooxetane oligomer, polymer, or copolymer containing a repeat group of the formula



5

wherein n is from 1 to about 6, wherein R is hydrogen or an alkyl having from 1 to about 6 carbon atoms, wherein DP is from 2 to about 100, and wherein each R_f, independently, is a linear or branched alkyl having from 1 to about 20 carbons with at least 50% of the hydrogen atoms being replaced by a fluorine atom.

10 66. A grafted polysiloxane composition according to claim 65, wherein said siloxane R¹, R², and R³, independently, is an alkyl having from 1 to 10 carbon atoms, and

15 wherein said R_f has at least 75% of said hydrogen atoms replaced by F.

20 67. A grafted polysiloxane composition according to claim 66, wherein said fluorooxetane repeat unit n is from 1 to about 3, R is an alkyl having from 1 to 3 carbon atoms, wherein R_f has at least 90% of said hydrogen atoms replaced by F, and wherein said R_f contains from 1 to about 10 carbon atoms.

25 68. A grafted polysiloxane composition according to claim 67, wherein said siloxane R¹, R², and R³, independently, is methyl or ethyl, and wherein in said fluorooxetane repeat unit R_f has from 1 to 7 carbon atoms.

69. A grafted polysiloxane composition according to claim 68, wherein in said fluorooxetane repeat unit R_f is perfluorinated and contains from 1 to 5 carbon atoms, and wherein DP is from 2 to about 4.

70. A flow, or wetting, or leveling agent, comprising the composition of claim 65.

5 71. A flow, or wetting, or leveling agent, comprising the composition of claim 67.

72. A flow, or wetting, or leveling agent, comprising the composition of claim 69.

10 73. A solution comprising a flow, or leveling, or wetting agent comprising the composition of claim 65.

15 74. A polymeric solution containing a flow, or leveling, or wetting agent, comprising the composition of claim 65, and wherein said polymer is an aqueous soluble dispersible, or emulsifiable polymer.

20 75. A polymeric solution containing a flow, or leveling, or wetting agent comprising the composition of claim 67, wherein said polymer is an aqueous soluble, dispersible or emulsifiable polymer.

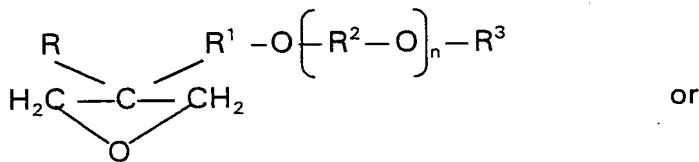
25 76. A polymeric solution containing a flow, or leveling, or wetting agent, comprising the composition of claim 67, wherein said polymer is an aqueous soluble, dispersible, or emulsifiable polymer, and wherein said polymer is a polyacetate, a polyacrylate, a polyacrylic acid, a polyester, a polyether, or a polyurethane, or a fluorine containing polymer, or combinations thereof.

77. A polymeric solution containing a flow, or leveling, or wetting agent, comprising the composition of claim 67, wherein said polymer is a solvent soluble polymer.

5 78. A polymeric composition containing a flow, or leveling, or wetting agent, comprising the composition of claim 68, wherein said polymer is a solvent soluble polymer, and wherein said polymer is a polyacrylate, a polyester, a polyurethane, an epoxy, an alkyd, or a fluorine containing polymer, or combinations thereof.

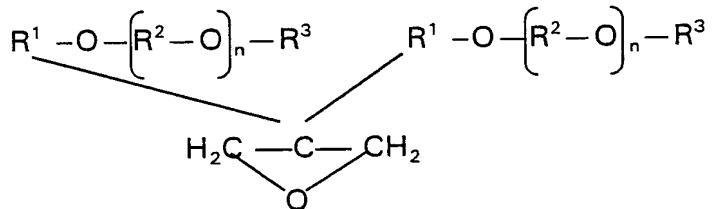
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79. A composition of matter, comprising a compound of the formula



A2A

20



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wherein R is hydrogen or an alkyl having from 1 to about 6 carbon atoms; wherein each R¹, independently, is an alkyl having from 1 to about 6 carbon atoms;

wherein each R^2 , independently, is an alkyl having from 1 to 6 carbon atoms,

wherein each R^3 , independently, is hydrogen, or a hydrocarbyl having from 1 to about 20 carbon atoms, and

5 wherein n is 0, or from 1 to about 100.

80. A composition of matter according to claim 79, wherein R is an alkyl having from 1 to about 6 carbon atoms, wherein each R^1 , independently, is an alkyl having from 1 to about 3 carbon atoms, wherein each R^2 , independently, is an alkyl having from 1 to about 3 carbon atoms, wherein each R^3 , independently, is hydrogen or from about 1 to about 18 carbon atoms.

81. A composition of matter according to claim 79, wherein said compound is said formula A2A.

15

82. A composition of matter according to claim 80, wherein said compound is said formula A2A.

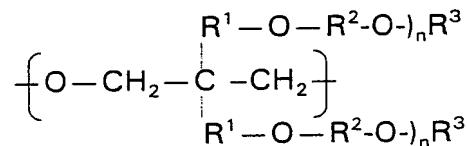
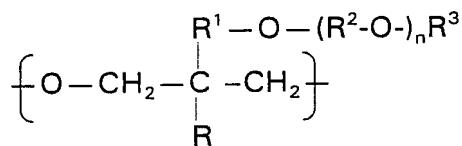
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83. A composition of matter according to claim 82, wherein n is from about 0 to about 20.

84. A composition of matter, comprising:

a polymer having a repeat unit of the formula

25



A3A

A3B

wherein R is hydrogen or an alkyl having from 1 to about 6 carbon atoms; wherein each R¹, independently, is an alkyl having from 1 to about 6 carbon atoms;

5 wherein each R², independently, is an alkyl having from 1 to 6 carbon atoms,

wherein each R³, independently, is hydrogen, or a hydrocarbyl having from 1 to about 20 carbon atoms, and

wherein n is 0, or from 1 to about 100.

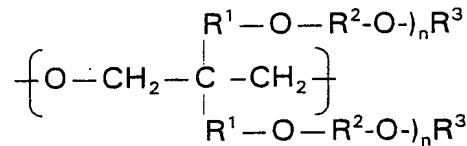
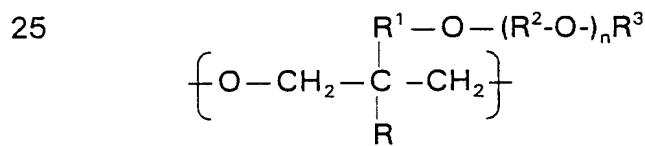
10 85. A composition of matter according to claim 84, wherein R is an alkyl having from 1 to about 6 carbon atoms, wherein each R¹, independently, is an alkyl having from 1 to about 3 carbon atoms, wherein each R², independently, is an alkyl having from 1 to about 3 carbon atoms, wherein each R³, 15 independently, is hydrogen or from about 1 to about 18 carbon atoms.

86. A composition of matter according to claim 84, wherein said compound is said formula A3A.

20 87. A composition of matter according to claim 85, wherein said compound is said formula A3A.

88. A composition of matter, comprising:

a copolymer having a repeat unit of the formula



wherein R is hydrogen or an alkyl having from 1 to about 6 carbon atoms; wherein each R¹, independently, is an alkyl having from 1 to about 6 carbon atoms;

5 wherein each R², independently, is an alkyl having from 1 to 6 carbon atoms,

wherein each R³, independently, is hydrogen, or a hydrocarbyl having from 1 to about 20 carbon atoms, and

wherein n is 0, or from 1 to about 100, and
a repeat unit of the formula

10



15

wherein each n, independently, is from 1 to about 6;
wherein R is hydrogen or an alkyl having from 1 to about 6 carbon atoms;

and

wherein each R_f is an alkyl having from 1 to about 20 carbon atoms and
wherein at least 50% of the hydrogen atoms is replaced by F.

20